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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,368	07/05/2006	Mathias Wendt	DE 040014	2478
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/585,368

**Applicant(s)**

WENDT ET AL.

**Examiner**

ADI AMRANY

**Art Unit**

2836

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 March 2009.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-19 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 05 July 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicants' arguments filed March 6, 2009 have been fully considered but they are not persuasive. Applicants' specification does not support the interpretation that the DC/DC converters do not buffer energy. The specification states that the DC/DC converters require "basically no buffering of energy" (page 11, lines 1-2) and that the DC/DC converters do not contain electrolyte capacitors (lines 2-4). These statements, however, are not equivalent. While a capacitor does in fact buffer energy (for example, by filtering noise), it is not the only component that does so.

The specification describes several situations in which the DC/DC converters "buffer energy." First, the converter only carries out a voltage conversion "as soon as a predetermined threshold value is reached or exceeded by the voltage supplied by the specific series connection of PV modules" (page 9, lines 18-23). This limitation is also recited in claims 1, "when a voltage supplied from a respective power generating unit meets or exceeds a threshold voltage, the associated DC/DC converter is configured to convert a current provided by said power generating unit." These phrases indicates that if the power generating unit voltage is below a threshold, the DC/DC converter does not output power. The power differential between the input and output of the DC/DC converter is evidence of "buffering power."

Second, the DC/DC converters supply output energy to the DC bus only if its output current is below a threshold value (page 10, lines 3-6). This means that if the current value is too high, then the DC/DC converter does not output energy. Since

turning the DC/DC converter output off has no effect on the photovoltaic power supply, there is a energy drop between the input and output of the DC/DC converter. This is interpreted as "buffering energy."

Third, the DC/DC converter "may supply more energy without raising the voltage on the DC bus" (page 10, lines 15-19). This phrase indicates that the DC/DC converter does not always output its maximum power rating. The ability of the DC/DC converter to hold back some amount of current from the DC bus is interpreted as "buffering energy."

It would be obvious to one skilled in the art that a converter would require at least nominal energy buffering in order to output a different current than was input. If the output current is lower than the input current, then the current differential must be absorbed somewhere (for example, in a resistor). If the output current is higher than the input current, then the input current must be re-circulated in a circuit to produce the required gain (for example, in a transformer). Both of these configurations result in at least nominal energy buffering. The current/voltage at the input of the converter is not the same as the current/voltage at the output. The difference must be absorbed or created in some part of the converter. While applicants' specification suggests that the conversion may be accomplished without a capacitor, this type of conversion is not equivalent to converting without buffering energy.

Further, applicants describe that the a drawback of the prior art systems was that the inverter contained a capacitor (page 4, lines 4-6). The description of the prior art does not mention that the DC/DC converters contain capacitors.

Lastly, applicants discuss that accumulators may be used to absorb excess energy on the DC bus (page 7, line 32 to page 8, line 7).. This component is an energy buffer.

### ***Drawings***

2. Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). The specification clearly labels figures 1-3 as "conventional."
3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the internal configuration of the DC/DC converters without any capacitors must be shown or the feature canceled from the claims. The figures only show the DC/DC converters represented by boxes. This is not sufficient to show how to construct a converter without a capacitor. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

4. The disclosure is objected to because there are no section headings. See MPEP §608.01(a).

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Claim 1 and 10-11 contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not describe how a person of ordinary skill in the art would be able to construct a DC/DC convert that does not buffer energy, as discussed above. The specification recites the preferred embodiment in which the DC/DC converters do not contain capacitors. This configuration, however, is not equivalent to the broad limitation that the DC/DC converters do not buffer any energy at

all. Claims 2-9 and 12-19 depend from claims 1 and 10, and are rejected under §112(1) as well.

For the purpose of the art rejection of the claims, the claim will be interpreted as reciting that the converters to not comprise capacitors.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 8-13 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jepsen (US 2005/0275386) in view of Vinciarelli (US 5,546,065).

With respect to claims 1 and 10, Jepsen discloses a decentralized power generation system (fig 1; par 43-44) and the associated method, comprising: a plurality of decentralized power generating units (FC, PV); a plurality of DC/DC converters (A) connected to another one of said power generating units and, when a voltage supplied from a respective power generating unit meets or exceeds a threshold voltage (obvious), the associated DC converter is configured to convert a current provided by said power generating units; a DC bus (3); and at least one power receiving component (B) connected to the DC bus, wherein the power receiving component is physically separated from said DC/DC converters.

The DC/DC converter will not have any power to convert when a source is not supplying any power (during nighttime). The "threshold voltage" of Jepsen is interpreted

as zero (0) volts. With zero volts, the power input to the converter is also zero ( $P = V * I$ ). Once a source begins to actually supply power (par 43, lines 1-5), the converter will then convert a current supplied by that source.

Further, all of the components are physically separated from each other, as is illustrated by borders and spacing between components (fig 1). Jepsen also clearly discloses that there is a DC bus between the converters (A) and the inverter (B).

Jepsen discloses that the DC/DC converter comprises a transformer and two capacitors (fig 3, items 9 and 16). Jepsen further discloses that the DC/DC converter is in fact comprised of a DC/AC inverter (18) and an AC/DC rectifier (14)(par 52). One skilled in the art would recognize that it would not be necessary to convert input DC power to an intermediate AC value in order to provide DC output power.

Vinciarelli discloses a DC/DC converter (fig 2; col. 7-9) that is comprised of a transformer and does not contain a capacitor. Jepsen and Vinciarelli are analogous because they are in the same field of endeavor, namely DC/DC converters comprising transformers. At the time of the invention by applicants, it would have been obvious to replace the DC/AC and AC/DC converters disclosed in Jepsen with the DC/DC disclosed in Vinciarelli in order to reduce the number of parts in the converter.

With respect to claim 11, Jepsen and Vinciarelli disclose the limitations of claim 1 and Jepsen further discloses controlling the output voltage of the converters not to exceed a predetermined value (par 18-19).

With respect to claim 2, Jepsen discloses the converters operate autonomously (par 4, 44).



With respect to claims 3 and 13, it would be obvious to one skilled in the art that a “mechanical connection” exists between the power sources and the converters, which are already physically connected by an electric transmission line.

With respect to claims 8 and 18, Jepsen discloses said power receiving component is an inverter to feed AC current into an AC power supply system (13).

With respect to claims 9 and 19, Jepsen discloses each of said power generating units comprises at least one photovoltaic module (PV). Jepsen discloses (par 43, lines 19-21) that the power sources are photovoltaic cells and that they may be other types of sources in other embodiments.

With respect to claim 12, Vinciarelli discloses a DC/DC converter without electrolyte capacitor, as discussed above.

9. Claims 4-6 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jepsen in view of Vinciarelli and Ostojic (US 6,771,052).

With respect to claims 4 and 14, Jepsen discloses a microcontroller on the power receiving component, but does not expressly disclose the microcontroller is adapted to survey a voltage on said DC bus and to reduce the power retrieved from said DC bus when the voltage on said DC bus is detected to be decreasing. Ostojic discloses a multiple-output DC/DC power supply with a microcontroller programmable to monitor the voltage of a bus and to react accordingly in the presence of a fault, which may be a reduction of power in the bus due to failure of one of the converters (col. 7, line 63 to col. 8, line 18).

Jepsen and Ostojic are analogous because they are from the same field of endeavor, namely microcontroller controlled converters. At the time of the invention by applicants, it would have been obvious to modify the Jepsen and Vinciarelli converters with the Ostojic microcontroller in order to increase the protection level of the system.

With respect to claims 5 and 15, Ostojic discloses the microcontroller is able to ramp-up and ramp-down the DC/DC converters besides controlling the sequence for turning on (col. 6, lines 48-62).

With respect to claims 6 and 16, Jepsen discloses at least one plug connection (darkened circles at the top of each converter) for electrically connecting a respective converter in common to said DC bus and, via said control line (5), to said at least one power receiving component (B).

10. Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jepsen in view of Vinciarelli, Ostojic and Najemy (US 5,809,256).

Najemy discloses a power switching converter with connector pins for power and data, wherein the pins for power are longer than the pins for data (col. 5, line 52 to col. 6, line 25). Jepsen, Vinciarelli, Ostojic and Najemy are analogous because they are from the same field of endeavor, namely converters. At the time of the invention by applicants, it would have been obvious to modify the Jepsen pins as shown in Najemy such that, during plug insertion/removal, selected pins are connected/disconnected first (Najemy; col. 2, lines 33-46).

**Conclusion**

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references cited in the enclosed list show several examples of prior art DC/DC converters. Harris (US 2005/0134239) and Bendikas (US 6,368,064) do not show the inner circuitry of the converters, but they also do not positively state that the converters contain capacitors. The remaining references state that the use of capacitors is optional (e.g. to filter noise).

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADI AMRANY whose telephone number is (571)272-0415. The examiner can normally be reached on Mon-Thurs, from 10am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-2800 x36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AA

/Stephen W Jackson/  
Primary Examiner, Art Unit 2836